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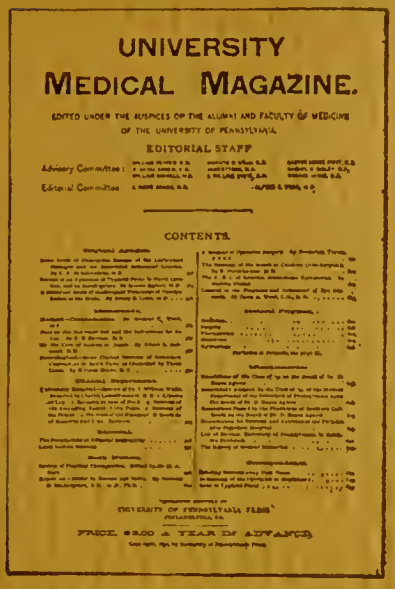

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THE CLINICAL VALUE OF REPEATED CAREFUL CORRECTION OF MANIFEST REFRACTIVE ERROR IN PLASTIC IRITIS.

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Attending Surgeon to Wills' Eye Hospital, Ophthalmic Surgeon to the Presbyterian Hospital, Philadelphia, etc.

THE CLINICAL VALUE OF REPEATED CAREFUL CORRECTION OF MANIFEST REFRACTIVE ERROR IN PLASTIC IRITIS.[1]

By Charles A. Oliver, A.M., M.D.,

Attending Surgeon to Wills' Eye Hospital, Ophthalmic Surgeon to the Presbyterian Hospital, Philadelphia, etc.

Since seeing the paper of Dr. John Green "On a Transient Myopia Occurring in Connection with Iritis," read before this Society in 1887, which was followed a year later by Dr. Mittendorf's communication on "Symptomatic Myopia," to be found in the Transactions of the same Society, the writer has been so impressed with the importance of the subject that he has taken advantage of his abundant clinical opportunities to make routine and periodic study of the refractive condition of every case possible of inflammation of the iris that has fallen under his care, hoping thereby to furnish some data upon this vexed question. Fortunately, personally, the subject has in his hands gone far beyond the theoretical points then at issue, and has resolved itself into a most valuable clinical procedure in his every-day treatment of this disease. To him it has been an attempt, at least, to formulate some definite guide and to obtain some certain rules for correct and appropriate dosage of both local and general measures in this most important branch of ocular therapeutics; an attempt which ordinarily is merely gauged by rough objective signs and the patient's feelings; an attempt that he hopes may add its mite to help perfect this now one of the most neglected portions of ophthalmology.

In this work the plan of study was not only limited to the ordinary subjective method of lens testing, but was accomplished by some of the more certain of the various objective plans, such as retinoscopy, ophthalmoscopy (both by the direct and indirect methods), the fundus image test, and lastly, by ophthalmometry as a method of control; Thomson's ametrometer and the chromatic aberration test also being employed at times.

[1] Read before the American Ophthalmological Society, July, 1892, and reported in full in the Annales d'Oculistique.

The results thus far obtained, which are more or less expressive of about forty suitable cases that have been carefully followed to resolution,[1] although necessarily tentative in some particulars, are here given without any further detail than offering a concise citation of two illustrative, partially theoretical, examples in order that an outline plan of the method of procedure pursued may be understood, a resumé of the five years' work being embodied in a brief series of observations which are followed by a number of conclusions that have been deemed of sufficient certainty to be offered at this time.

Case I.—On the 7th of January, 1889, T. H. R., aged 47 years, the wife of a traveling salesman, and the mother of two healthy children, came for a left sided plastic iritis. As stated by her physician, she was inoculated by her husband in September of 1888, the initial lesion being followed in a short time by epitrochlear and post-cervical enlargement, buccal and faucal erythema and mucous patches, papular syphilide, slight alopecia, and quite a large subperiosteal swelling in the left frontal region. When first seen there was a pronounced plastic iritis in the left eye of nine days' duration, there being an irregularly contracted pupil, many fine posterior synechiæ, with a marked deposition of pigment on Descemet's membrane; the iris stroma being thickened and dulled in tint. There was no involvement of the right eye, which had its uncorrected vision of two-thirds brought to normal by the employment of a + C. o. 50 D. ax. 90°. The vision of the inflamed eye, which was reduced to one-tenth, could not be perceptibly increased by any lens combination.

By the bi-daily use of drachm masses of mercurial ointment, and the free application of an eight-grain solution of cocaine and atropine every third hour for two days' time, the iris was freed from its tags of adhesion to the capsule of the lens, allowing the pupil to become nearly seven millimetres diameter in all meridians. At this visit vision was brought from one-tenth to two-fifths of normal by the use of a — S. 2. D. ⌒ — C. o. 75 D. ax. 180°, the uncorrected artificial focussing point obtained by a S. 4. D., being situated at about fifteen centimetres. Vision of the fellow eye was raised from two-thirds to normal by the previous Ah correction.

Two days later, coincident with much betterment of the objective conditions, uncorrected vision of the left eye rose to nearly two-thirds of normal; this acuity being increased to full two-thirds sight by the employment of — S. o. 75 D. ⌒ — C. o. 75 D. ax. 180°. The right eye still remained uninvolved. At this time the atropine and cocaine, although kept to the same strengths, were reduced in frequency to three times a day.

[1] Quite a number of data were also gained and made use of from patients who escaped from observation before completion of the case.

Three days after this, the sixteenth day of the disease, vision still remained at two-thirds by the use of a — S. o. 50 D. ⌒ — C. o. 50D. ax. 180°, the eye being much quieter.

In two days' time the minus cylinder was alone necessary to bring the vision of the inflamed organ from two-thirds to nearly full acuity. The instillation of the cocaine and atropine was ordered to be used but once a day, and although the eye was much better, the papules subsided and the secondary node on the os frontalis had disappeared, the ointment was continued.

On the following day a plus meridian of one-quarter diopter strength, at right angles to that corrected by the negative cylinder, appeared, causing the manifest refraction to assume that of mixed astigmatism.

Eight days later, under the same treatment, the minus cylinder was lost, and vision was brought from not quite full acuity to normal by a + C. o. 50 D. ax. 90° alone. The local treatment was now reduced to atropine every other night, the use of the mercury being faithfully persisted in.

Eight days after the above visit, during which she failed to report, a violent plastic iritis burst out in the right eye, causing severe ciliary neuralgia. The patient having been previously warned, immediately instilled quite a large amount of atropine into the right conjunctival sac, with the result of almost thoroughly dilating the pupil. Vision in this eye, which was now reduced to one-half, was brought to nearly normal by — S. 1. D. ⌒ — C. o. 75 D. ax. 180°.

In three days' time, in spite of the liberal use of cocaine and atropine, continuance of mercurial inunction and free leeching, a Descemetitis appeared, lowering vision to an incorrectible one-fourth. Hot stupes were now added to the treatment, resulting in a quick subsidence of the severity of the symptoms and a restoration of vision from two-thirds of normal to nearly full acuity by the use of — C. o. 50 D. ax. 180°, the uncorrected artificial focussing point being but little inside of twenty-five centimetres.

Seven days later a fresh exacerbation of iritis in the left eye again lowered its vision to one-tenth of normal, which could be brought to full acuity by a — S. 1. D. ⌒ — C. o. 50 D. ax. 180°; the atropine having been instilled four times daily for two days.

Three days after this visit, while both eyes were quiet and no ocular or circum-orbital pain of any kind existed, vision in the right eye, which was now two-thirds of normal, was brought to almost full acuity by the use of a + C. o. 50 D. ax. 90° (the lens originally used when O. S. was primarily inflamed), while that of the left eye, which equaled one-half, took a mixed astigmatism correction of — C. o. 50 D. ax. 180° ⌒ + C. o. 25 D. ax. 90° to bring it to normal.

As the original correction that had been required in the right eye had been reached, and as all of the other symptoms seemed to be in abeyance, the atropine was stopped in the right eye for experiment's sake, and was reduced to but once a day in the left eye. In ten days' time, under the modified use of the atropine and the continuance of the alterative, both uncorrected visions rose to almost normal, that of the right eye still retaining one-half diopter convex cylinder at ninety degrees to make the letters clearer, while the mixed astigmatism in the left eye became Ahm in variety; the new lens combination necessary to give normal acuity reading — C. o. 25 D. ax. 180° ⌒ + C. o. 50 D. ax. 90°.

Six days later, vision in each eye was the same ($\frac{5}{5}$), and each ametropia equaled + C. o. 50 D. ax. 90°. Atropine was stopped and the mercury was gradually lessened until in three weeks' time, when her eyes were perfectly quiet, she was again referred to her family physician. The patient, who has been seen within a short time, asserts that she has not had any return of her eye symptoms, and that her present general health is seemingly good.

Case II.—On the 6th of June, 1891, the writer was consulted by a well-known scientific man, aged 35 years, who, while pursuing a most exacting literary life, complained of a recurrence of asthenopia, which was promptly relieved after careful estimation under the full influence of atropine, by the employment of the following cylindrical combination:

O. D. + C. o. 50 D. ax. 90° ⌒ — C. o. 25 D. ax. 180°
O. S. + C. o. 25 D. ax. 90° ⌒ — C. o. 50 D. ax. 180°

each eye obtaining a vision of $\frac{5}{5}$ with its appropriate correction, accompanied by an esophoria of two P. D. at five metres and muscle balance at thirty-five centimetres distance.

On the 2d of September of the same year he returned with a beginning left-sided plastic iritis of recent syphilitic origin.

A series of quickly repeated instillations of cocaine and atropine soon caused the pupil to become dilated almost *ad maximum*, except at one point up where a minute tag of adhesion to the anterior capsule caused the pupil to assume a heart shape. Vision, which had fallen with his correction to two-thirds of normal, was brought to full acuity by the following combination: — S. o. 25 D. ⌒ — C. o. 75 D. ax. 180°. Careful study with an ophthalmometer of Javal and Schiötz at this time failed to place this increase in the cornea.

By the prompt employment of mercurial ointment, general and local rest, and the instillation of the one-twentieth of a grain of sulphate of atropia three times daily, the synechia gave way in forty hours, leaving a perfectly round pupil, though the eye required a

minus one-half diopter spherical lens over that of the first visit making — S. o. 75 D. ⌒ — C. o. 75 D. ax. 180°, to bring the distant vision to normal, and to secure the best point of near vision at twenty-five centimetres with an additional S. 4. D. There was no pain, the media were clear, and there were no gross fundus changes of any character.

One week later, after faithfully continuing the necessary treatment, the vision of the affected eye was found for the first time to be normal with the original correction, the patient voluntarily stating that he had noticed a sudden improvement just after the instillation of the atropia the day before. The drug was now used night and morning only, while the alterative was scrupulously persisted in.

Two weeks after the first appearance of the "mistiness," which had been the first and only subjective symptom noticed by the patient, vision remained normal with his correcting lenses, and all external symptoms of ocular inflammation had gone.

While carefully and assiduously watching for any objective and subjective signs of refractive change, the atropia was gradually reduced day by day, and the general alterative lessened in amount and frequency, and finally replaced by small doses of corrosive sublimate, until in five weeks' time from the beginning of the attack the atropine was discontinued.

Four weeks later, the eyes being perfectly quiet, although daily employed, were, for experiment, carefully re-estimated for correcting lenses while under the liberal employment of atropine. The lenses and the positions of the principal meridians of astigmatism were found unchanged from those of the original correction, this good result continuing unaltered to the present writing.

Observations.

(1) In nearly every case of iritis, even after full pupillary dilatation, especially in the plastic form of the disease, there was an ever changeable, though relative increase of the refractive power, the amount of which in the majority of cases could be readily determined by careful, repeated and systematic measurement.[1]

(2) In every case of plastic iritis that could be properly studied, there were similar reversals of the principal astigmatic angles and meridians so commonly seen during the passage of ordinary hypermetropia into myopia; these temporary changes from the one gross form of ametropia (H.) to the other (M.), expressing themselves both subjec-

[1] A similar, though, of course, less marked, example of this condition, during almost any form of strong or persistent mydriatic correction of ametropia, especially in young hypermetropes, can be seen in any practice where, although the pupillary areas seem to be dilated *ad maximum*, yet the findings of one day are found to be weaker than those of the morrow, and where repeated trials are compulsory before astigmatic angles can be properly chosen.

tively and objectively in every case that could be steadily watched and persistently followed by the following routine of condition: H + Ah, Ah, Ahm, Amh, Am, and M + Am.

(3) In cases of plastic iritis occurring in young highly hypermetropic eyes, especially where corrections had never been worn or were originally too weak, the refractive changes seemed in most instances never to reach those recognized as myopia; the decrease of the hypermetropia appearing to vacillate some one to three diopters less than the total hypermetropia, and this being accompanied by varying expressions of astigmatism.

(4) In quite a number of cases of plastic iritis that could be properly studied by the ophthalmometer there appeared minor though at times plainly appreciable degrees of curious lessenings and increases of the corneal curvatures in the same case at different periods of the disease.

(5) In nearly every case of plastic iritis that could be carefully and repeatedly studied by the ophthalmometer (even after any technical and mechanical error in the method had been expunged), the corneal changes seemed to register much less in proportion to those found in the same cases by other objective methods and the subjective plan of lens testing; thus indirectly showing the undoubted presence of lenticular disturbance.

(6) In some cases of commencing iritis, especially in hypermetropic eyes, there seemed to be a most active clonic spasm of the ciliary muscle, causing rapid increases and decreases of lenticular form, so pronounced, in fact, that it became at times impossible to obtain any definite refractive result. Moreover, in this class of cases, persistent pupillary contraction often took place the moment any important curative measure was lessened or temporarily suspended.

(7) In many cases of the plastic form of the disease, where there were points of ciliary tenderness of no matter how trivial a nature, especially when associated with irregularity of pupil form, the astigmatic changes seemed to preponderate and remain more or less fixed for long periods of time.

(8) Experimental research by the use of repeated instillations of strong solutions of eserine in such cases, showed marked refractive increases and all manner of change in the principal astigmatic curves; these peculiarities expressing themselves not only subjectively by the patients' assertions with trial lenses, but evidencing themselves by retinoscopic and other objective methods.

(9) In every case of iritis where there was much visible pigment deposition, or where the crypts of the iris were thickened and infiltrated, and the pupil, although apparently equally enlarged in all meridians, refused to dilate to any more than to one-half or two-

thirds that of full size, the manifest refractive error, where adequately obtainable, seemed to become fixed at one point until objective betterment became apparent.

(10) In many cases of the plastic form of the disease, even during apparent full pupillary dilatation, where the weaker solutions of strong drugs, such as atropia and daturia were inadequate to alter the manifest refractive error, therapeutical combinations such as cocaine and atropine, with the employment of the artificial leech, or resource to stronger drugs, such as duboisia and hyoscyamine, seemed in several instances to soon unmask some hidden refractive error—markedly that of astigmatism—and to permit speedier cure of the disease.

Conclusions.

(I) In nearly every case of iritis, especially of the plastic forms, there is a period, even after full pupillary dilatation has been seemingly artificially obtained, during which, owing to the persistence of inflammatory changes in the uveal tract, as so well expressed by the clinical evidences of ciliary spasm, etc., graduated instillations of mydriatics should be employed; the duration and gravity of this period being most accurately measured and determined by the systematic and repeated estimation of the varying manifest errors of refraction.

(II) While it is true that during this stage in nearly every case of iritis, ophthalmometric—or rather, keratometric study—seems to show at times that there are bizarre and curious changes of corneal curvature,[1] yet it must be conceded from the additional findings of other optometric methods, that the bulk of the ametropic change in such cases is due to the perversion of lens action from what Koller terms "spastic accommodation" as the result of ciliary irritation and inflammation.[2]

(III) In nearly every case of iritis the duration of this stage can be promptly shortened by the judicious and ready use of some quick and powerful intraocular muscle paralyzant; the character of the necessary form of the drug and its amount at the time in every instance being judged by the amount of manifest refractive error found at the time.

(IV) In some few such cases of iritis, however, during the acme of the attacks, especially if the case be pronounced in type and stubborn in character, the higher grades of the manifest refraction error seem to obstinately persist with but little variation in amount, and to defy for a long time reasonable local and general measures.

[1] It is the intention of the writer to make more extended study in this direction, reserving his present unpublished results for another communication.

[2] Based upon clinical experience and reasoning alone, without the shadow of evidence from experimental research, the writer here hazards the thought that impediment in lymph stream flow or even lymph formation itself may be one of the factors in the production of the ametropic condition.

(V) In some few cases of incipient iritis, where clonic spasm of the ciliary muscle seems to present itself, or pupillary contraction repeatedly persists, local muscle paralysis, as evidenced by a relative decrease of refractive error, is often quickly obtainable by the prompt and more energetic employment of some of the more powerful and appropriate local and general remedies.

(VI) Consequently, the careful systematic estimation of the manifest error of refraction found during attacks of iritis is of great value in the rational and scientific treatment of this disease, offering itself as not only a means by which the general prognosis of the affection can be made more certain from time to time during its progress, but permitting itself to serve as a measure or guide, as it were, by which the attacks may be more properly and more understandingly treated, and their duration shortened by the judicious and intelligent use of appropriate drugs, thus giving better opportunity for lessening the chances of harmful and permanent after changes to one of the most important and yet one of the most susceptible organs of the ocular apparatus.